

Degradable Ionic liquids as efficient catalysts for the glycolysis of PET

Yachan Liu,^{a,b} Xingmei Lu,^{a,b,*} Qing Zhou,^{a,b} and Suojia Zhang^{a,b,*}

^aBeijing Key Laboratory of Ionic Liquids Clean Process; CAS Key Laboratory of Green Process and Engineering; State Key Laboratory of Multiphase Complex Systems; Institute of Process Engineering; Chinese Academy of Sciences, Beijing 100190 (PR China)

^bSino Danish College; University of Chinese Academy of Sciences; Beijing 100049 (PR China)
E-mail: xmlu@ipe.ac.cn, sjzhang@ipe.ac.cn

Key words: Polyethylene terephthalate; glycolysis; ionic liquid.

Abstract: As a thermoplastic polymer resin with excellent mechanical property and chemical stability, poly ethylene terephthalate (PET) is widely used in high-strength fibers, packaging, film and plastic bottles.^[1-2] The increasing consumption of PET has caused serious environmental damage, which made PET recycling critical. The common recycling method is the glycolysis of PET into BHET monomer with effective catalysts.^[3] In this work, a series of degradable ionic liquid catalysts were developed, which made the glycolysis process greener and environmentally friendly. The conditions of temperature, time and catalyst dosage were optimized. Under the optimization condition, the conversion of PET and yield of BHET were 100% and 85%, respectively. Thus, this catalytic system is promising in industrial application of recycling of PET.

Acknowledgments:

This research was supported financially by the National Natural Scientific Fund of China (No.21878292, No.21776289), K. C. Wong Education Foundation (No.GJTD-2018-04) and the Strategic Priority Research Program of Chinese Academy of Science (No. XDA21060300).

References

1. Rostami, A.; Wei, C. J.; Guerin, G.; Taylor, M S. *J. Angew. Chem. Int. Ed.* **2011**, *50*, 2059.
2. Sanchez, A. C.; Collinson, S. R. *J. Eur. Polym.* **2011**, *47*, 1970.
3. George, N.; Kurian, T. *J. Ind Eng Chem Res.* **2014**, *53*, 14